

WHAT IS CLAIMED IS:

1. A control system for a hybrid vehicle, which has: a first prime mover (1) and a second prime mover (7) for transmitting a power to a wheel (31); a
5 power distributor (10) for distributing the power of said first prime mover (1) to the wheel (31) and to a rotary device (6); a transmission (19) arranged on a power transmission route from said second prime mover (7) to the wheel (31); and a gear ratio controller (SL1, SL2) for controlling a gear ratio of the transmission (19), comprising:
10 a sub-controller (88, 120) for controlling a status of said transmission (19) to enable suppression of decline in a driving performance of the vehicle, even when the function of said gear ratio controller (SL1, SL2) declines.
- 15 2. A control system for a hybrid vehicle according to Claim 1,
wherein said sub-controller (88, 120) has a function to set the gear ratio smaller than the maximum gear ratio, as the gear ratio of said transmission (19).
- 20 3. A control system for a hybrid vehicle according to Claim 1,
wherein said transmission (19) has a first frictional engagement device (B1) and a second frictional engagement device (B2) applied/released by an oil pressure fed from said gear ratio controller (SL1, SL2);
wherein said gear ratio controller (SL1, SL2) has a first solenoid
25 valve (SL1) for feeding/discharging the oil pressure to/from said first

frictional engagement device (B1), and a second solenoid valve (SL2) for feeding/discharging the oil pressure to/from said second frictional engagement device (B2); and

wherein a low gear stage of a large gear ratio is set in said transmission (19) by releasing said first frictional engagement device (B1) and by applying said second frictional engagement device (B2), and a high gear stage of a small gear ratio is set in said transmission (19) by applying said first frictional engagement device (B1) and by releasing said second frictional engagement device (B2).

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4. A control system for a hybrid vehicle according to Claim 3,

wherein said first solenoid valve (SL1) includes a solenoid valve for outputting an apply pressure to said first frictional engagement device (B1) under an OFF state, and for draining the oil pressure from said first frictional engagement device (B1) under an ON state; and

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wherein said second solenoid valve (SL2) includes a solenoid valve for draining the oil pressure from said second frictional engagement device (B1) under the OFF state, and for outputting the apply pressure to said second frictional engagement device (B2) under the ON state.

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5. A control system for a hybrid vehicle according to Claim 3,

wherein said sub-controller (88, 120) includes a valve (88, 120) for draining the oil pressure from said second frictional engagement device (B2), by operating the apply pressure of said first frictional engagement device (B1) as a signal pressure, regardless of an operating condition of said second

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solenoid valve (SL2).

6. A control system for a hybrid vehicle according to Claim 1,
wherein said first prime mover (1) includes an internal combustion
5 engine (1);

wherein said second prime mover (7) includes a motor generator (7);

wherein said rotary device (6) includes other motor generator (6);

wherein said power distributor (10) includes a planetary gear
mechanism having, a sun gear (12) connected with said other motor
10 generator (6), a ring gear (13) arranged concentrically with the sun gear (12)
and connected with an output member (25), and a carrier (15) holding a
pinion gear (14) meshing with the sun gear (12) and the ring gear (13) into
which a torque of said internal combustion engine (1) is inputted, and;

wherein said output member (25) is connected with said
15 transmission (19).

7. A control system for a hybrid vehicle according to Claim 6,
wherein said transmission (19) has:

a first fixing element (28) in which its rotation is halted
20 selectively by said first frictional engagement device (B1);

a second fixing element (21) in which its rotation is halted
selectively by said second frictional engagement device (B2);

an input element (20) connected with said second prime
mover (7), and

25 an output element (24) for transmitting the torque to said

wheel (31); and

wherein said transmission (19) is constructed of a planetary gear mechanism for differential actions with three elements of the input element (20), the output element (31), and any of the fixing elements (28, 21).

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8. A control system for a hybrid vehicle according to Claim 7,
wherein said planetary gear mechanism includes a Ravigneaux type planetary gear mechanism.

10 9. A control system for a hybrid vehicle according to Claim 1, further comprising:

a first frictional engagement device (B1) and a second frictional engagement device (B2) applied/released by the oil pressure transmitted thereto, in case a first or second gear ratio is set in said transmission (19);

15 a control oil pressure generation valve (56) for generating a predetermined control oil pressure in accordance with a signal pressure;

wherein said gear ratio controller (SL1, SL2) has a function to generate an oil pressure to be transmitted to said first frictional engagement device (B1) and second frictional engagement device (B2), by
20 regulating the control oil pressure generated by said control oil pressure generation valve (56); and

a selector valve mechanism (101, 102, 132, 144, 145) for selecting the signal pressure from any of the control oil pressures, which is regulated by said gear ratio controller (SL1, SL2), and which is generated by said
25 control oil pressure generation valve (56).

10. A control system for a hybrid vehicle according to Claim 9,

wherein said selector valve mechanism (101, 102, 132, 144, 145) has:

a function to select the oil pressure to be transmitted to said
5 second frictional engagement device (B2) as the signal pressure, in case of
setting the first gear ratio by raising the oil pressure to be transmitted to
said second frictional engagement device (B2) and by lowering the oil
pressure to be transmitted to said first frictional engagement device (B1),

a function to select the oil pressure to be transmitted to said
10 first frictional engagement device (B1) as the signal pressure, in case of
setting the second gear ratio by raising the oil pressure to be transmitted to
said first frictional engagement device (B1) and by lowering the oil pressure
to be transmitted to said second frictional engagement device (B2), and

a function to select the control oil pressure generated by said
15 control oil pressure generation valve (56) as the signal pressure, in case of
interchanging between said first and second gear ratio.

11. A control system for a hybrid vehicle according to Claim 3, further
comprising:

20 a control oil generation valve (56) for generating the control oil
pressure in accordance with a signal pressure, and for feeding a generated
control oil pressure to each of said solenoid valve (SL1, SL2), and

a selector valve mechanism (101, 102, 132, 144, 145) for selecting
any of the oil pressures which is outputted by said first solenoid valve (SL1)
25 and which is outputted by said second solenoid valve (SL2) as the signal

pressure, and for feeding a selected oil pressure to said control oil pressure generation valve (56).

12. A control system for a hybrid vehicle according to Claim 11,

5 wherein said selector valve mechanism (101, 102, 132, 144, 145) includes:

a first selector valve (101, 104) for outputting the oil pressures outputted from said first solenoid valve (SL1) and outputted from said control oil pressure generation valve (56) in case said first solenoid valve (SL1) is outputting the oil pressure, and for outputting the oil pressure outputted from the second solenoid valve (SL2), in case said first solenoid valve (SL1) is not outputting the oil pressure; and

a second selector valve (102, 132, 145) for outputting the output oil pressure of said second solenoid valve (SL2) outputted from said first selector valve (101, 104) as said signal pressure in case said second solenoid valve (SL2) is outputting the oil pressure, and for outputting the output oil pressure of said first solenoid valve (SL1) or of said control oil pressure generation valve (56) outputted from said first selector valve (101, 104) as said signal pressure in case said second solenoid valve (SL2) is not outputting the oil pressure.

13. A control system for a hybrid vehicle according to Claim 9,

wherein said selector valve mechanism (101, 102, 132, 144, 145) is constructed to control the signal pressure to be inputted to said control oil pressure generation valve (56) lower than a predetermined oil pressure, in

case said transmission (19) is controlled impossible to transmit the torque.

14. A control system for a hybrid vehicle according to Claim 12,

wherein said first selector valve (101, 144) has a port (130, 150) for
5 communicating an oil passage (117, 141) for feeding said signal pressure to
said control oil pressure generation valve (56) with a drain, in case each of
said solenoid valve (SL1, SL2) is not outputting the oil pressure.

15. A control system for a hybrid vehicle according to Claim 9,

10 wherein said selector valve mechanism (101, 102, 132, 144, 145)
hass an oil passage (142, 143) for outputting the signal pressure as the
apply pressure to said first frictional engagement device (B1) or to said
second frictional engagement device (B2), in case of outputting the oil
pressure outputted from said gear ratio controller (SL1, SL2) as said signal
15 pressure.

16. A control system for a hybrid vehicle according to Claim 11,

wherein said selector valve mechanism (101, 102, 132, 144, 145) has:
an oil passage (143) for outputting the signal pressure as the
20 apply pressure to said first frictional engagement device (B1), in case of
outputting the output oil pressure of said first solenoid valve (SL1) as said
signal pressure; and

an oil passage (142) for outputting the signal pressure as the
apply pressure to said second frictional engagement device (B2), in case of
25 outputting the output oil pressure of said second solenoid valve (SL2) as

said signal pressure.

17. A control system for a hybrid vehicle according to Claim 12,

wherein said first selector valve (101, 144) has a port (108, 156) for
5 outputting the oil pressure outputted from said first solenoid valve (SL1), to
said second selector valve (102, 132, 145) and to said first frictional
engagement device (B1); and

wherein said second selector valve (102, 132, 145) has a port (153,
157, 168, 171, 170) for outputting the oil pressure outputted from said
10 second solenoid valve (SL2) and inputted through said first selector valve
(101, 144), to said control oil pressure generation valve (56) as said signal
pressure, and to said second frictional engagement device (B2) as the apply
pressure.

15 18. A control system for a hybrid vehicle according to Claim 9,

wherein said selector valve mechanism (101, 102, 132, 144, 145) has
an oil passage (153, 157, 168, 171, 170) for feeding a lubricating oil to each
frictional engagement device (B1, B2), in the transient state of
interchanging apply/release state of said first frictional engagement device
20 (B1) and said second frictional engagement device (B2).

19. A control system for a hybrid vehicle according to Claim 11,

wherein said selector valve mechanism (101, 102, 132, 144, 145) has
an oil passage (153, 157, 168, 171, 170) for feeding lubricating oil to at least
25 any of said first frictional engagement device (B1) and said second frictional

engagement device (B2), in case both of the oil pressures outputted from said first solenoid valve (SL1) and outputted from said second solenoid valve (SL2) exceeds predetermined value.

5 20. A control system for a hybrid vehicle according to Claim 12,
 wherein said selector valve (144) has a port (157) for outputting a
lubricating oil to said second selector valve (145), with outputting the oil
pressure outputted from said first solenoid valve (SL1); and

 wherein said second selector valve (145) has an oil passage (170) for
10 feeding the lubricating oil fed from said first selector valve (144), to at least
any one of said first frictional engagement device (B1) and said second
frictional engagement device (B2), when said second selector valve (145) is
outputting the oil pressure outputted from said second solenoid valve (SL2).

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